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UTILITY PATENT APPLICATION TRANSMITTAL (Only for new nonprovisional applications under 37 CFR 1.53(b))	Attorney Docket No.	5104/71695	Total Pages	
	First Named Inventor or Application Identifier			
	Schrimmer et al.			
	Express Mail Label No.	EM509793059US		

APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents.	ADDRESS TO: Assistant Commissioner for Patents Box Patent Application Washington, DC 20231
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<p>1. <input checked="" type="checkbox"/> Fee Transmittal Form (Submit an original, and a duplicate for fee processing)</p> <p>2. <input checked="" type="checkbox"/> Specification [Total Pages 17] (preferred arrangement set forth below)</p> <ul style="list-style-type: none">- Descriptive title of the invention- Cross References to Related Applications- Statement Regarding Fed sponsored R & D- Reference to Microfiche Appendix- Background of the invention- Brief Summary of the invention- Brief Description of the Drawings (if filed)- Detailed Description- Claim(s)- Abstract of the Disclosure <p>3. <input checked="" type="checkbox"/> Drawing(s) (35 USC 113) [Total Sheets 3]</p> <p>4. Oath or Declaration [Total Pages 3]</p> <p>a. <input checked="" type="checkbox"/> Newly executed (original or copy)</p> <p>b. <input type="checkbox"/> Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 17 completed) (Note Box 5 below)</p> <p>i. <input type="checkbox"/> DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).</p> <p>5. <input type="checkbox"/> Incorporation By Reference (useable if Box 4b is checked) The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.</p>	<p>6. <input type="checkbox"/> Microfiche Computer Program (Appendix)</p> <p>7. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)</p> <p>a. <input type="checkbox"/> Computer Readable Copy</p> <p>b. <input type="checkbox"/> Paper Copy (identical to computer copy)</p> <p>c. <input type="checkbox"/> Statement verifying identity of above copies</p>
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ACCOMPANYING APPLICATION PARTS	
8. <input checked="" type="checkbox"/> Assignment Papers (cover sheet & document(s))	
9. <input type="checkbox"/> 37 CFR 3.73(b) Statement (when there is an assignee)	<input type="checkbox"/> Power of Attorney
10. <input type="checkbox"/> English Translation Document (if applicable)	
11. <input type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449	<input type="checkbox"/> Copies of IDS Citations
12. <input type="checkbox"/> Preliminary Amendment	
13. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503) (Should be specifically itemized)	
14. <input checked="" type="checkbox"/> Small Entity Statement filed in prior application, Statement(s) Status still proper and desired	
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☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: _____

18. CORRESPONDENCE ADDRESS					
<input type="checkbox"/> Customer Number or Bar Code Label <input type="checkbox"/> Correspondence address below					
(Insert Customer No. or Attach bar code label here)					
NAME	Mitchell J. Weinstein, Esq.				
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FEE TRANSMITTAL

Note: Effective October 1, 1997.
Patent fees are subject to annual revision.

TOTAL AMOUNT OF PAYMENT (\$40.00)

Complete if Known

Application Number	Not yet assigned
Filing Date	May 28, 1998
First Named Inventor	Schrimmer et al.
Group Art Unit	Not yet assigned
Examiner Name	Not yet assigned
Attorney Docket Number	5104/71695

METHOD OF PAYMENT (check one)

1. ☐ The Commissioner is hereby authorized to charge indicated fees and credit any over payments to:

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Deposit Account Name: WELSH & KATZ, LTD.

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FEE CALCULATION

1. FILING FEE

Large Entity Small Entity

Fee Code	Fee (\$)	Fee Code	Fee (\$)	Fee Description	Fee Paid
101	790	201	395	Utility filing fee	
106	330	206	165	Design filing fee	
107	540	207	270	Plant filing fee	
108	790	208	395	Reissue filing fee	
114	150	214	75	Provisional filing fee	

SUBTOTAL (1) (\$) -0-

2. CLAIMS

Total Claims	Extra	Fee from below	Fee Paid
Independent Claims	-20 =	X	
Multiple Dependent Claims	-3 =	X	

Large Entity Small Entity

Fee Code	Fee (\$)	Fee Code	Fee (\$)	Fee Description
103	22	203	11	Claims in excess of 20
102	82	202	41	Independent claims in excess of 3
104	270	204	135	Multiple dependent claim
109	82	209	41	Reissue independent claims over original patent
110	22	210	11	Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$) -0-

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Small Entity Fee Code	Fee (\$)	Fee (\$)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	400	216	200	Extension for reply within second month	
117	950	217	475	Extension for reply within third month	
118	1,510	218	755	Extension for reply within fourth month	
128	2,060	228	1,030	Extension for reply within fifth month	
119	310	219	155	Notice of Appeal	
120	310	220	155	Filing a brief in support of an appeal	
121	270	221	135	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,320	241	660	Petition to revive - unintentional	
142	1,320	242	660	Utility issue fee (or reissue)	
143	450	243	225	Design issue fee	
144	670	244	335	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	40.00
146	790	246	395	Filing a submission after final rejection (37 CFR 1.129(a))	
149	790	249	395	For each additional invention to be examined (37 CFR 1.129(b))	

Other fee (specify) _____

Other fee (specify) _____

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 40.00

SUBMITTED BY

Typed or Printed Name: Mitchell J. Weinstein, Esq.

Signature: 

Date: 5-28-98

Complete (if applicable)

Reg. Number: 37,963

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5-28-98 *Arnold R. Smith*

Date

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EA1509793059US

ILLUMINATED GOLF BALL

Field of the Invention

This invention pertains to an illuminated golf ball, more particularly, the invention pertains to an illuminatable golf ball having an impact-resistant lighting device therein and a translucent cover for providing visible indication of the golf ball location.

Background of the Invention

Golf has become a tremendously popular game, not just in the United States, but worldwide. The game has become so popular that it is often difficult to secure "tee" times at sufficiently reasonable hours to be able to play through nine or eighteen holes while still playing in daylight.

Because golf courses often have holes that average 300 to 400 yards in length and cover large areas, it is difficult, if not impossible, to illuminate an entire course to permit play at night. As such, golf is a particularly limited daytime game. Some "pitch and putt" courses may be sufficiently illuminated to permit play in the evening, however, most individuals that play the game of golf would, of course, prefer to play a standard length course.

Attempts have been made to provide golf balls that are sufficiently visible in the dark to permit evening play. However, such golf balls are typically coated with luminous paints, or include chemiluminescent lighting devices, and do not provide a sufficiently long period of bright or strong luminescence to permit play of an entire round of evening golf. One known device includes a chemiluminescent light stick that is inserted into an opening in the ball. When the light stick is activated, it emits a low luminescent light that is visible for a limited period of time. Such chemiluminescent golf balls may include a translucent outer skin or coating to permit a wider range of view of light emitted from the ball. However, those who have had occasion to use a chemiluminescent light sticks will recognize that such sticks often lose their ability to emit a relatively bright light in a short period of time. Moreover, such liquid

chemiluminescent light stick inserts can affect the weight and balance of the ball, and thus the flight of the ball.

Another glow-in-the-dark golf ball includes a phosphorescent or luminescent glowing element that is molded within the center of the ball. The ball includes a
5 translucent or transparent outer cover that permits the internal luminescent element to be viewed through the outer covering of the ball. However, these golf balls suffer from the same drawbacks as those that include chemiluminescent light sticks.

Game balls having lights installed therein are known in the art. However, as will be recognized by those skilled in the art and by those that play the game of golf,
10 golf balls are subject to tremendously high impact forces during play. As such, while attempts have been made to create golf balls that will provide a sufficient amount of light such that they can be seen along a fairway in the evening, such attempts have fallen short of creating a golf ball that can withstand the tremendous impact forces and still retain the lighting device or lighting element in condition to emit light.

15 Accordingly, there continues to be a need for an illuminated golf ball that emits sufficient light to permit locating the ball along a fairway at night, which ball withstands the severe impact forces and other environmental conditions to which the ball may be subjected.

20 Summary of the Invention

An illuminatable golf ball includes an outer translucent shell and an inner core portion surrounded by the outer shell. The inner core portion supports a self-contained lighting device. In one embodiment, the inner core portion has a bore therein that is in alignment with an opening in the outer shell.

25 The lighting device is formed within the inner core portion. The lighting device includes an energy source, such as a battery, and at least one and preferably two lighting elements. In an externally actuatable embodiment, the lighting device includes connectors, at least one of which is flexible, extending between the energy source and the lighting elements. The energy source lighting elements and connectors

define an electrical circuit having a deenergized state and an energized state for providing electrical energy from the energy source to the lighting devices.

The flexible connector is separable from the energy source such that the electrical circuit is switchable between the energized state to illuminate the lighting devices and the deenergized state to open the circuit and thus deenergize the lighting devices.

In one embodiment of the externally actuatable embodiment, the ball includes a plunger that is at least in part non-conductive. The plunger is insertable into the ball through the opening in the outer shell and through the bore in the inner core portion. When inserted into the ball, the plunger interrupts the circuit by separating the at least one flexible connector from the battery terminal, thereby opening the circuit and consequently deenergizing the lighting elements.

In a preferred embodiment the energy source is a battery, and most preferably a button-type battery. In a present embodiment, the ball includes two lighting elements that are light emitting diodes (LEDs) connected in the electrical circuit in parallel. Thus, if one of the lighting elements fails, the other lighting element will light.

Preferably, the inner core portion is formed of polyurethane and surrounds essentially the entirety of the lighting device except for the light emitting portions of the LEDs. In a most preferred embodiment, the outer shell portion is formed of a cut-resistant, non-abrasive polyurethane material. Preferably, the polyurethane outer shell is formed with dimples therein such that the ball resembles a traditional golf ball.

An alternate embodiment of the externally actuatable golf ball includes a plunger that is at least in part electrically conductive, that, when inserted into the golf ball completes the electrical circuit to energize the lighting elements. In this embodiment, one of the flexible connectors is positioned in spaced relation to the battery thus establishing an open circuit, and inserting the plunger into the ball completes or closes the circuit.

Still another embodiment of the illuminated golf ball includes a lighting device that is actuatable by includes a switch that is actuatable by a force applied to the

switch. Preferably, the lighting device includes a timer that deenergizes the lighting element after a predetermined time of actuation. In this embodiment the ball is fully sealed.

Advantageously, the present illuminatable golf ball withstands the severe impact of a golf club head from, for example, a drive shot, while providing the “look-and-feel” of a traditional golf ball. In addition, the present golf ball is sufficiently impact resistant and environment resistive so that it will maintain its ability to light even when the ball is subjected to water such as from a water hazard.

Other features and advantages of the present invention will be apparent from the following detailed description, the accompanying drawings, and the appended claims.

Brief Description of the Drawings

FIG. 1 is a partially broken away perspective view of one embodiment of an externally actuatable illuminated golf ball in accordance with the present invention, the ball being illustrated, in part, with the plunger inserted therein for clarity of illustration;

FIG. 2 is a cross-sectional view of the golf ball of FIG. 1 taken along line 2--2 of FIG. 1, with the plunger being fully inserted into the ball;

FIG. 3 is a cross-sectional view taken along line 3--3 of FIG. 1;

FIG. 4 is a cross-sectional view taken along line 4--4 of FIG. 1, illustrating the battery and flexible connectors resting thereon, and being illustrated with the plunger in position to open the lighting circuit;

FIG. 5 is a cross-sectional view similar to FIG. 4 shown with the plunger removed from between the battery and the flexible connector to complete the lighting circuit;

FIG. 6 is a cross-sectional view of an alternate embodiment of the externally actuatable illuminated golf ball, the view being similar to that of FIG. 2, showing the conductive plunger separate from the ball for clarity of illustration;

FIG. 7 is a cross-sectional view of the embodiment of FIG. 6, the view being similar to that of FIG. 3, showing the conductive plunger separate from the ball for clarity of illustration;

FIG. 8 is a cross-sectional view taken along line 8--8 of FIG. 7, illustrating the flexible connectors relative to the battery, with the plunger removed for clarity of illustration, and with the electrical circuit thus being in a deenergized state;

FIG. 9 is a cross-sectional view similar to FIG. 8 with the conductive plunger in place between and connecting the battery and the connector, with the electrical circuit thus being in an energized state;

FIG. 10 is a simplified circuit diagram of the illuminating device of the golf ball of FIGS. 1-9;

FIG. 11 is a partially broken away perspective view similar to FIG. 1 illustrating an embodiment of the illuminated golf ball having a lighting device that is actuable by shock or force exerted on the ball;

FIG. 12 is a cross-sectional view of the golf ball of FIG. 11 taken along line 12-12 of FIG. 11; and

FIG. 13 is a simplified circuit diagram of the illuminating device of the golf ball of FIGS. 11 and 12.

Detailed Description of the Preferred Embodiments

While the present invention is susceptible of embodiment in various forms, there is shown in the drawings and will hereinafter be described presently preferred embodiments with the understanding that the present disclosure is to be considered an exemplification of the invention and is not intended to limit the invention to the specific embodiments illustrated.

Referring now to the figures and in particular to FIG. 1, there is shown one embodiment of an externally actuable illuminated golf ball 10 in accordance with the principles of the present invention. The ball 10 includes an electrical lighting device 12 therein. The lighting device 12 includes at least one, and preferably two lighting elements, such as the illustrated light emitting diodes 14, 16 (LEDs). The LEDs 14,

16 are lighted or energized by an energy source 18, such as a battery, positioned in the ball 10. As will be apparent from the drawings, the battery 18 can be of the common, button-type, used for watches and cameras, such as a 3-volt lithium cell battery. The battery 18 should be selected so as to provide sufficient voltage to illuminate the LEDs 14, 16 for a prolonged period of time.

The LEDs 14, 16 are part of an electrical circuit 20 (see FIG. 10) that is defined by the LEDs 14, 16, the energy source 18, a pair of flexible connectors 22, 24, as will be described in more detail herein, and other electrical connectors, such as wires or LED leads 26-32, extending between the LEDs 14, 16 and the flexible connectors 22, 24. It will be recognized by those skilled in the art that all of the connectors 22, 24 and wires 26-32 extending between the battery 18 and the LEDs 14, 16 must be of an electrically conductive material. The at least one and preferably both of the connectors 22, 24 are formed having an arcuate shape so that they maintain contact with the terminals of the battery 18.

As can be seen from FIGs. 1 and 3, the battery 18, flexible connectors 22, 24 and connections 26-32 between the LEDs 14, 16 and the flexible connectors 22, 24 are mounted within a non-conductive inner core portion 34 of the ball 10. The inner core portion 34 is formed so as to maintain all of the components therein in a generally fixed position relative to one another.

The ball 10 includes a plunger 36 that is insertable therein, that inserts between and separates one of the flexible connectors 22 from the battery 18. In a current embodiment, the plunger 36 inserts between one of the flexible connectors 22 and the positive terminal, or cathode (indicated by +) of the battery. In this manner, the plunger 36 essentially opens the circuit 20 to switch the circuit 20 into a deenergized state so that the lights 14, 16 are off. When the plunger 36 is removed from the ball 10, the flexible connector 22 contacts with the cathode +, thus closing the electrical circuit 20 and lighting the LEDs 14, 16.

The plunger 36 is insertable into the ball 10 through a bore 38 that is defined in the inner core portion 34. The inner core portion 34 can be formed from a wide variety of non-conductive materials. In a current embodiment, the inner core portion

34 is formed of a plastic or polymeric material, such as polyurethane, that is relatively easily molded around the components.

The ball 10 includes an outer translucent shell portion 40 enveloping the inner core portion 34 and enveloping the LEDs 14, 16. The outer shell 40 includes an opening 42 that is in alignment with the bore 38 in the inner core portion 34. The outer shell 40 is translucent to permit light from the LEDs 14, 16 to radiate therethrough, so that the light from the LEDs 14, 16 can be viewed from outside of the ball 10 when the circuit 20 is closed and the lights 14, 16 are energized. In a current embodiment, the outer shell 40 is formed of a clear polyurethane material that is abrasive and cut-resistant, which material can be formed with dimples 44 so that the outer shell 40 resembles the outer covering of a traditional golf ball. The particular formulation of polyurethane can be selected so that the material is translucent, and has high impact and cut resistance, while at the same time maintaining other characteristics of a golf ball, e.g. the “look and feel” of a traditional golf ball.

Although the electrical circuit 20 is relatively simple and straightforward, it will now be described with reference to a golf ball 10 having a pair of LEDs 14, 16, a pair of flexible connectors 22, 24, and a button-type battery 18, as illustrated in the figures. The LEDs 14, 16 each include two leads (26, 28 and 30, 32, respectively). A first lead 26 from the first LED 14 is connected to one of the flexible connectors 22 at about an end thereof. The other lead 28 from the LED 14 is connected to the opposing flexible connector 24 at or near the opposing end of the connector 24. The first and second leads 30, 32 from the other LED 16 are likewise connected to the first and second flexible connectors 22, 24. In this manner, each LED 14, 16 has a lead that is connected to each of the flexible connectors 22, 24. This arrangement provides LEDs 14, 16, that are essentially connected in parallel across the electrical circuit 20. Thus, if one of the LEDs, for example 14, was to fail, the other LED 16 would still be within a portion of the switchable circuit 20, and thus would still light.

Manufacture or formation of the golf ball 10 is straightforward. The components of the electrical lighting device 12 are first positioned relative to one another, with the flexible connectors 22, 24 resting on the battery terminals and the

LED leads 26-32 connected to the flexible connectors 22, 24. The plunger 36 is then inserted within the electrical lighting device 12 between one of the flexible connectors 22 and one of the terminals of the battery 18, preferably the cathode (+). The inner core portion 34 is then formed around the electrical lighting device 12, leaving the
 5 light emitting portions 46, 48 of the LEDs 14, 16 outside of the inner core portion 34.

The inner core portion 34 is formed with the plunger 36 in place so that the flexible connector 22 has sufficient freedom to move into contact with the battery 18 (when the plunger is removed), and to move away and separate from the battery 18 (when the plunger is inserted) to open the circuit 20. The translucent outer shell 40 is
 10 then molded around the inner core portion 34, again with the plunger 36 in place, so that the opening 42 in the outer shell 40 is formed in alignment with the bore 38 in the inner core portion 34. The outer shell 40 can, as discussed above, be formed with dimples 44 therein so that the golf ball 10 has the "look-and-feel" of a traditional golf ball.

As will be apparent from the drawings, use of the golf ball 10 is rather simple. To illuminate the LEDs 14, 16, the plunger 36 merely has to be pulled or removed from the golf ball 10. When the plunger 36 is removed from the golf ball 10, the flexible connector 20 flexes downward (referring to the view of FIG. 3), thus making contact with the cathode (+) of the battery 18. This closes the electrical circuit 20,
 20 illuminating the LEDs 14, 16. A player can then play a round of golf. When it is desired to turn off or deenergize the LEDs 14, 16, the non-conductive plunger 36 is merely inserted into the ball 10 through the opening 42 in the outer shell 40 and through the bore 38, thus separating the flexible connector 22 from the battery 18. This opens the circuit 20 and deenergizes the LEDs 14, 16.

Advantageously, the present illuminated golf ball 10 provides a number of advantages over known illuminated golf balls. First, the integrally molded LEDs 14, 16 provide a substantial amount of light to locate the ball 10 along a fairway in the evening. Unlike known devices that, for example, use chemiluminescent light sticks, the present golf ball 10 emits a sufficiently bright light for a relatively prolonged
 30 period of time so that the ball can be located even in a relatively thick rough portion of

a golf course. In addition, unlike some known "glow-in-the-dark" golf balls, the present golf ball 10, uses an internal battery 18, and thus does not require the storage of "energy" from an external light source. Those skilled in the art will recognize that some types of luminescent or phosphorescent devices require external light in order to store energy so that they can later emit that energy in the form of light. The present ball 10 uses an internal battery 18 to provide energy for illuminating the LEDs 14, 16.

In addition, it has been observed that known lighted golf balls such as those that use chemiluminescent light sticks can be improperly balanced or weighted due to the liquid light stick. This can adversely affect the flight of the ball, and can thus be a severe detriment, particularly to a serious golfer. The present illuminatable golf ball 10, on the other hand, has a substantially even weight distribution and center of gravity, and does not have a "moving" liquid central region. Thus, the present golf ball 10 has a "truer" flight than the known light golf balls.

It has also been observed that the present golf ball 10 can withstand severe and repeated impact and still maintain its ability to emit light. That is, after repeated impact by golf club heads as well as other impacts, the ability of the present golf ball 10 to emit light is not affected. Thus, it is anticipated that the useful, lighted life of the golf ball 10 will not be limited as a result of impact, but will more likely be limited by loss of the golf ball. Moreover, because of the plunger 36 "switch" arrangement, the LEDs 14, 16 can be deenergized or turned off so that the power from the battery 18 can be reserved for night time use of the ball 10. The present golf ball 10 also withstands other environmental conditions to which a traditional golf ball may be subjected. For example, the present golf ball 10 can be hit into a sand trap or into a water hazard without adversely affecting the ability of the ball 10 to emit light. That is, immersing the ball in water has not been shown to adversely affect the electrical circuit 20 and the ability of the LEDs 14, 16 to illuminate.

In the event that the golf ball 10 is kept until such time as the battery is drained and the LEDs 14, 16 no longer illuminate, the ball 10 can be used as just "another" golf ball to be used during daytime play. Those who play the game of golf will recognize that it is certainly desirable, if not necessary, to maintain a fairly substantial

quantity of golf balls on hand when playing a round of golf. This is particularly true when playing on a challenging golf course.

An alternate embodiment 110 of the externally actuatable illuminated golf ball is illustrated in FIGS. 6-9. The alternate embodiment 110 is constructed in a similar fashion to the embodiment 10 of the golf ball illustrated in FIGS. 1-5, and includes a lighting device 112, a pair of lighting elements 114, 116, and a battery 118, defining an electrical circuit 120.

The ball 110 includes a pair of connectors 122, 124, at least one of which is flexible, and wires or leads 126, 128, 130, 132, extending between the connectors 122, 124 and the lighting elements 114, 116. The ball 110 is formed in a manner similar to the ball 10, having an inner core portion 134 and an outer shell portion 140. The core portion 134 has a bore therein 138 that is alignment with an opening 142 in the shell 140.

A plunger 136 is insertable into the ball 110 through the opening 142 and the bore 138. In this embodiment of the ball 110, one of the connectors, for example, connector 122 is positioned in the inner core portion 134, in spaced relation to the battery 118, when the plunger 136 is removed from the ball 110. That is, with the plunger 136 removed from the ball 110, the connector 122 and the battery 118 are not electrically connected, the electrical circuit 120 is open (i.e., deenergized), and thus the elements 114, 116 are not lit. When the plunger 136 is inserted into the ball 110, it provides an electrical connection between the battery 118 and the connector 122, thus completing the circuit 120.

It will be apparent from the drawings and the present description, that the plunger 136 is formed of, at least in part, an electrically conductive material. In one contemplated arrangement, the plunger 136 remains in the ball 110 once it is positioned therein, and the ball 110 remains lit once it is activated. In another contemplated arrangement, the plunger 136 is subsequently removable from the ball to deenergize the lighting circuit 120.

Still another embodiment 210 of the illuminated golf ball is illustrated in FIGS. 11-13. In this embodiment, the lighting device 212 is completely self-contained and

does not require an external actuation element such as the plunger 36, 136 illustrated in the previous embodiments 10, 110. In this embodiment of the golf ball 210, the lighting device 212 includes an energy source such as the illustrated battery 218, lighting elements, such as the illustrated LEDs 214, 216, a circuit board 217 to which the LEDs 214, 216 are connected by leads 226, 228, 230, 232, a conductor plate 233 to complete the electrical circuit between the battery 218 and the LEDs 214, 216. The lighting device 212 further includes control circuitry 235 that be incorporated into a controller 237 that includes a shaker or otherwise force-actuatable switch 239. As will be recognized by those skilled in the art, the switch 239 changes state from the deenergized state to the energized state by the application of force on the switch 239. This can be in the form of an impact, such as when the ball 210 is struck by a golf club or the like.

The control circuitry 235 and switch 239 have associated therewith a timer 241 that can be incorporated into the controller 237. The timer 241 maintains the circuit in the energized state after actuation for a predetermined time. In an anticipated embodiment, the timer 241 maintains the circuit energized for a period of between about five and about nine minutes, so that the LEDs 214, 216 remain illuminated for this predetermined period of time. The inner core portion 234 of the ball 212, as well as the outer shell 240 are otherwise similar to the embodiments 10, 110 of the ball illustrated in FIGS. 1-10.

In use, the ball 210 merely needs to be hit or otherwise jarred sufficiently to close the switch 239 and energize the circuitry 235. The timer 241 functions to deenergize the circuitry 235 upon expiration of the predetermined period of time. In this manner, the battery 218 power is reserved during non-lighted periods. In this embodiment of the ball 210, the circuitry 235, including the switch 239 is impact-resistant once the switch 239 is closed and/or the circuitry is in the energized state.

From the foregoing it will be observed that numerous modifications and variations can be effectuated without departing from the true spirit and scope of the novel concepts of the present invention. It is to be understood that no limitation with respect to the specific embodiments illustrated is intended or should be inferred. The

THE

What Is Claimed Is:

1. An illuminatable golf ball comprising:
 - an outer translucent shell having an opening therein;
 - an inner core portion surrounded by the outer shell, the inner core having a
 - 5 bore therein in alignment with the opening in the outer shell;
 - a self-contained lighting device contained at least in part within the inner core portion, the lighting device including an energy source, at least one lighting element, and at least two connectors extending between the energy source and the at least one lighting element defining an electrical circuit having a deenergized state and an
 - 10 energized state for providing electrical energy from the energy source to the at least one lighting device, at least one of the connectors being flexible and separable from the energy source, at least a portion of the at least one flexible connector being positioned within the inner core bore; and
 - a plunger configured for insertion into the bore,
 - 15 wherein when the plunger is inserted into the bore between the energy source and the at least one flexible connector to change the state of the electrical circuit from one of the energized state to the deenergized state and the deenergized state to the energized state.
2. The illuminatable golf ball in accordance with claim 1 wherein the plunger is at least in part electrically non-conductive and wherein when the plunger is removed from the bore, the at least one flexible connector contacts the energy source and closes the electrical circuit to change the state of the circuit from the deenergized state to the energized state.
- 25 3. The illuminatable golf ball in accordance with claim 1 wherein the plunger is at least in part electrically conductive and wherein when the plunger is inserted into the bore, the plunger, completes the electrical circuit to change the state of the electrical circuit from the deenergized state to the energized state.

4. The illuminatable golf ball in accordance with claim 1 wherein the energy source is a battery.

5. The illuminatable golf ball in accordance with claim 4 wherein the battery is a button-type battery.

6. The illuminatable golf ball in accordance with claim 1 wherein the lighting device includes two lighting elements and wherein the lighting device includes two connectors, at least one of the connectors being a flexible connector that is positioned adjacent to and separable from the energy source.

7. The illuminatable golf ball in accordance with claim 2 wherein the entirety of the plunger is formed of an electrically non-conductive material.

8. The illuminatable golf ball in accordance with claim 3 wherein the entirety of the plunger is formed of an electrically conductive material.

9. The illuminatable golf ball in accordance with claim 1 wherein the inner core portion is formed of polyurethane.

10. The illuminatable golf ball in accordance with claim 1 wherein the outer shell is formed of polyurethane.

11. The illuminatable golf ball in accordance with claim 1 wherein the outer shell is formed with dimples.

12. The illuminatable golf ball in accordance with claim 6 wherein the two lighting elements are connected in the electrical circuit in parallel.

13. A method for making an illuminatable golf ball comprising the steps of:

positioning an energy source, at least one lighting element, and at least two connectors relative to one another such that the at least two connectors extend between the energy source and the at least one lighting element to define an electrical circuit having a deenergized state and an energized state for providing electrical energy from the energy source to the at least one lighting device, at least one of the connectors being flexible and separable from the energy source;

positioning a plunger between the flexible connector and the energy source;

forming an inner core portion around the electrical lighting device such that the energy source, the at least two connectors, and a portion of the lighting element are within the inner core portion; and

forming an outer translucent shell around the inner core portion so as to envelope the inner core portion.

14. The method for making an illuminatable golf ball in accordance with claim 13 including positioning the connectors so as to rest on the energy source.

15. The method for making an illuminatable golf ball in accordance with claim 13 including positioning one of the connectors in spaced relation to the energy source.

16. An illuminatable golf ball comprising:
 an outer translucent shell having an opening therein;
 an inner core portion surrounded by the outer shell;
 a self-contained lighting device contained at least in part within the inner core portion, the lighting device including an energy source, at least one lighting element, and an electrical circuit including a switch and being switchable between a deenergized state and an energized state for providing electrical energy from the energy source to the at least one lighting element,

5 17. The illuminatable golf ball in accordance with claim 16 wherein the
golf ball is fully sealed.

10

19. The illuminatable golf ball in accordance with claim 17 wherein the lighting device includes a timer that deenergizes the lighting element after a predetermined time of actuation.

Abstract Of The Disclosure

An illuminatable golf ball includes an outer translucent shell and an inner core portion surrounded by the outer shell. The ball includes a self-contained lighting device formed and contained at least in part within the inner core portion. The lighting device includes an energy source, a pair of lighting elements, and connectors extending between the energy source and the lighting elements defining an electrical circuit. The lighting device includes a switch for energizing and deenergizing the lighting device. The switch can include a plunger insertable into the ball through an opening in the outer shell and through a bore in the inner core portion. The plunger is configured to change the state of the electrical circuit when it is inserted into and removed from the bore to energize and deenergize the lighting elements. The switch can also be of the force actuatable type.

FIG. 1

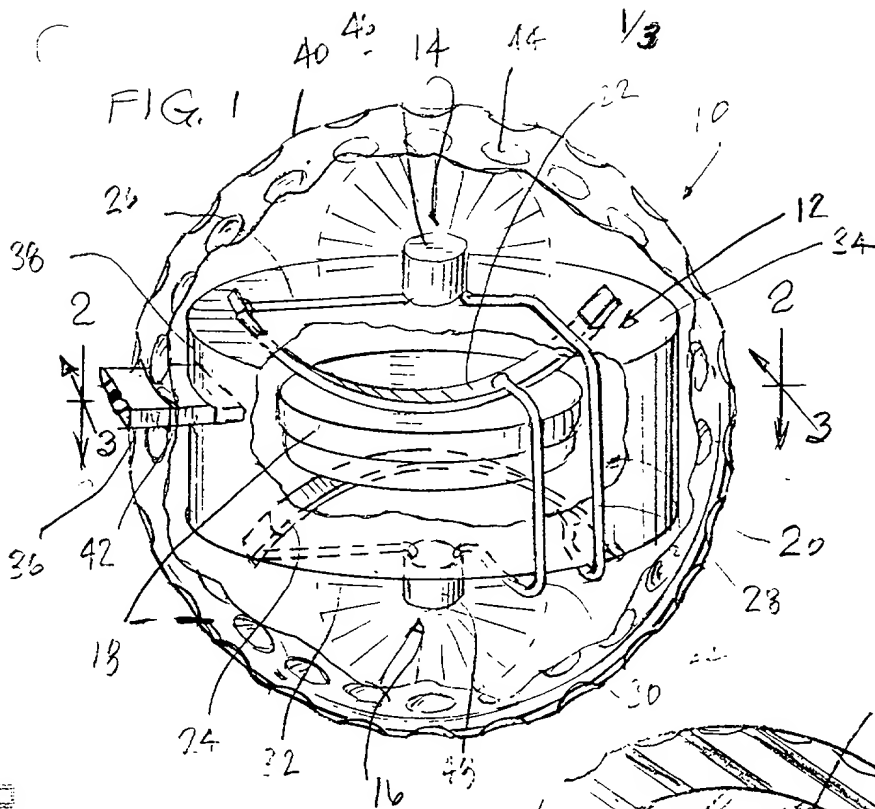


FIG. 4

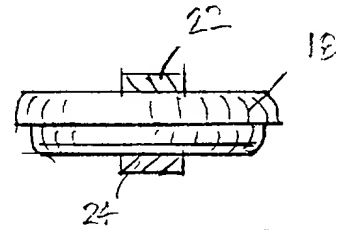
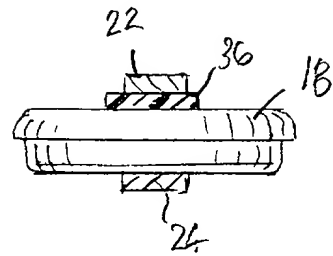


FIG. 5

FIG. 2

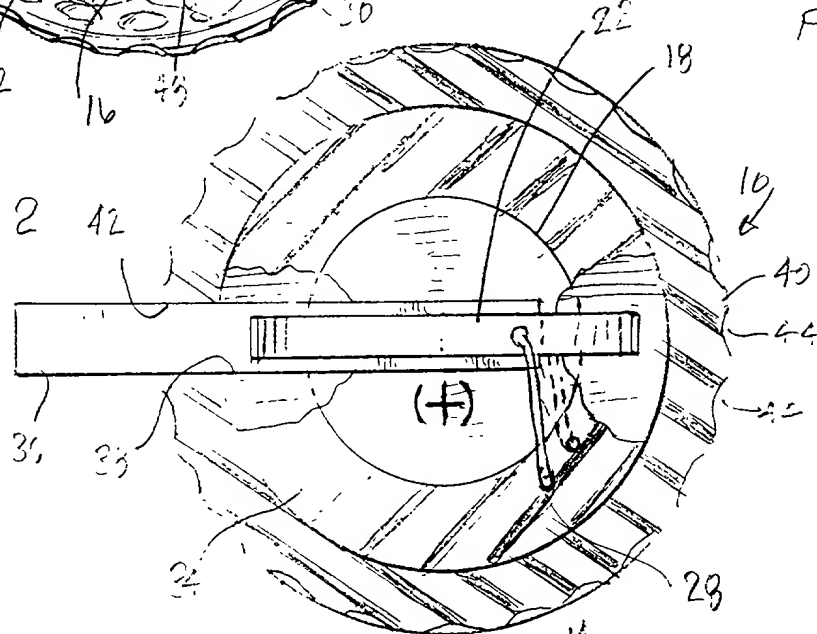
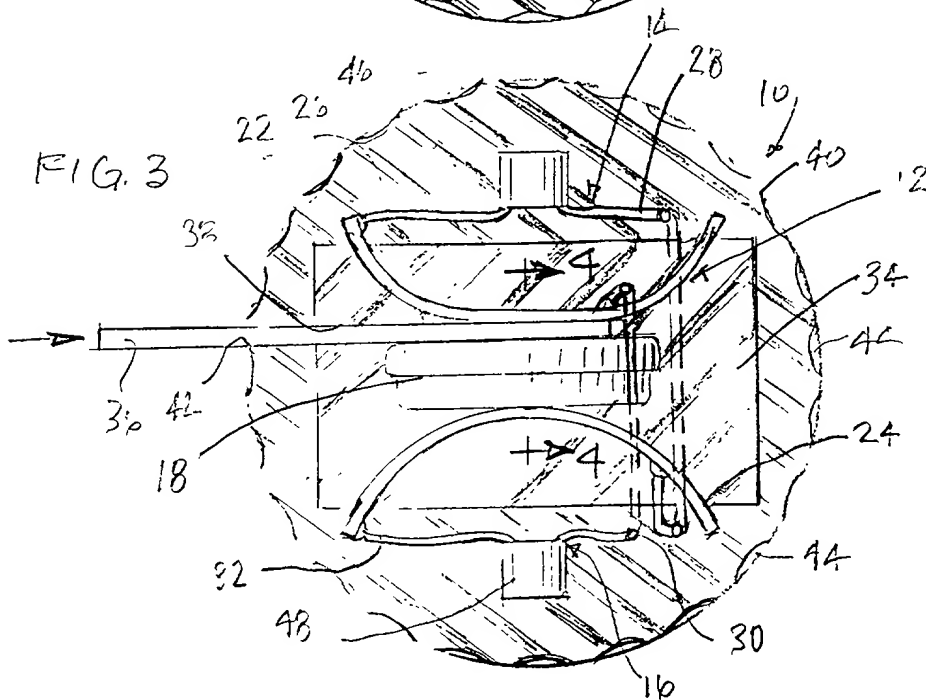


FIG. 3



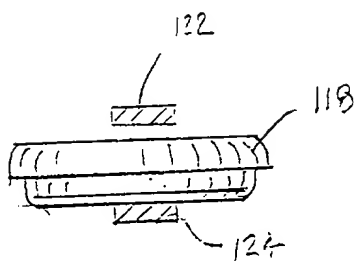
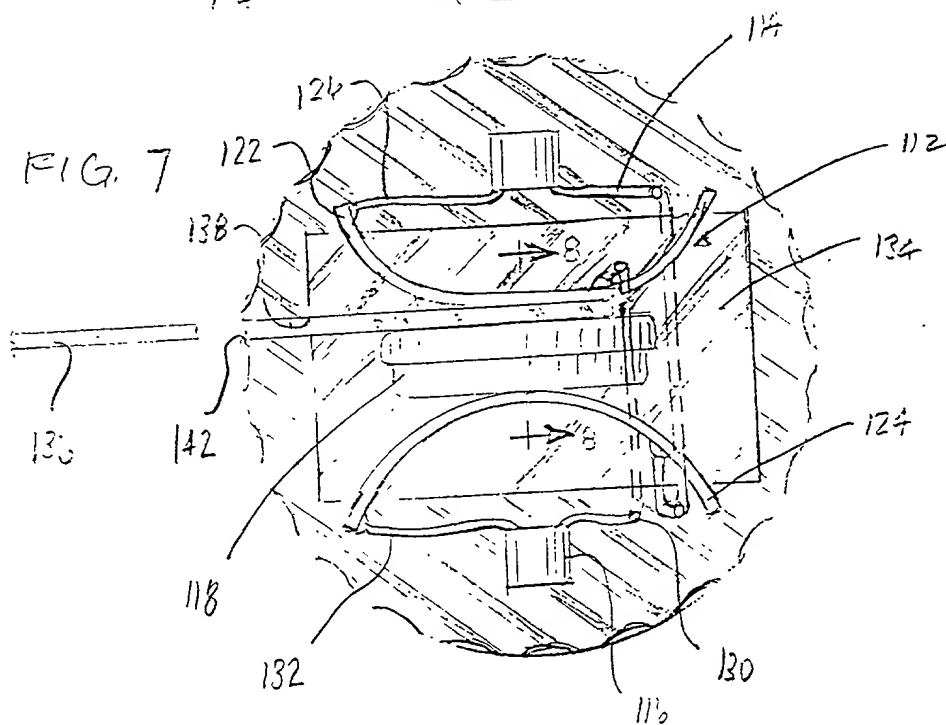
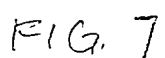
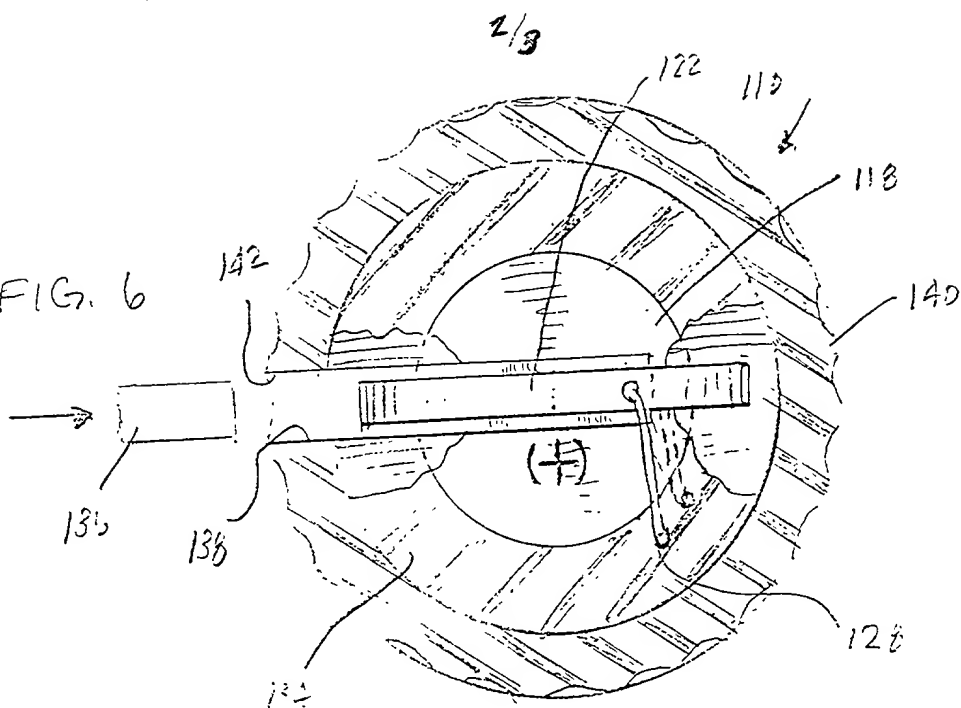
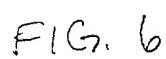


FIG. 8

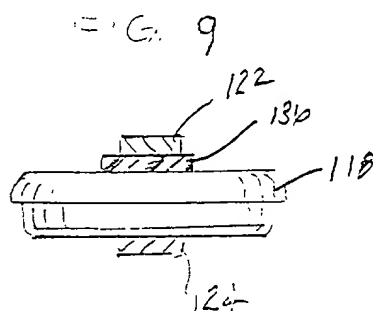
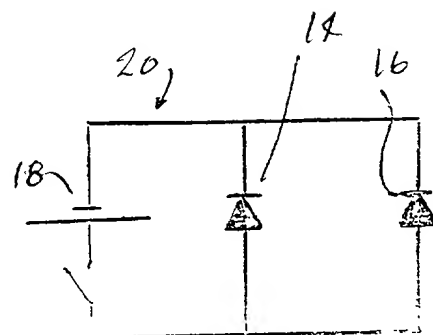
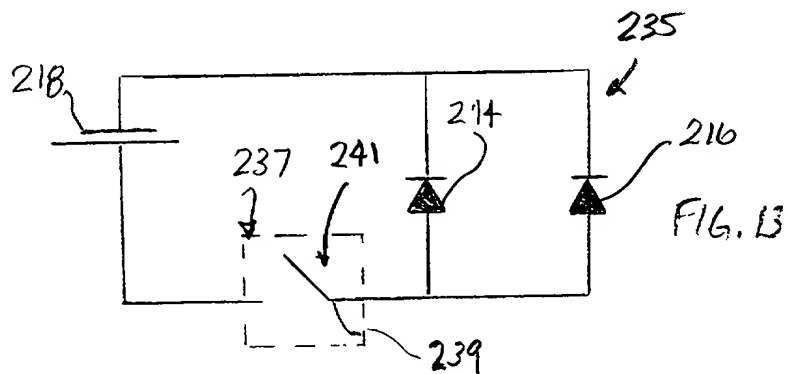
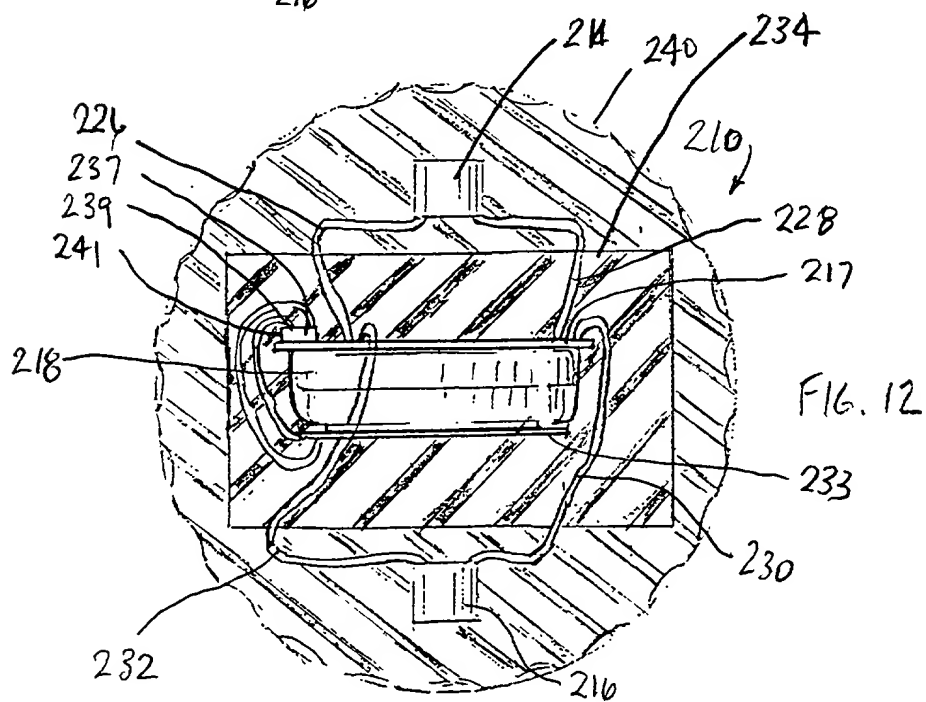
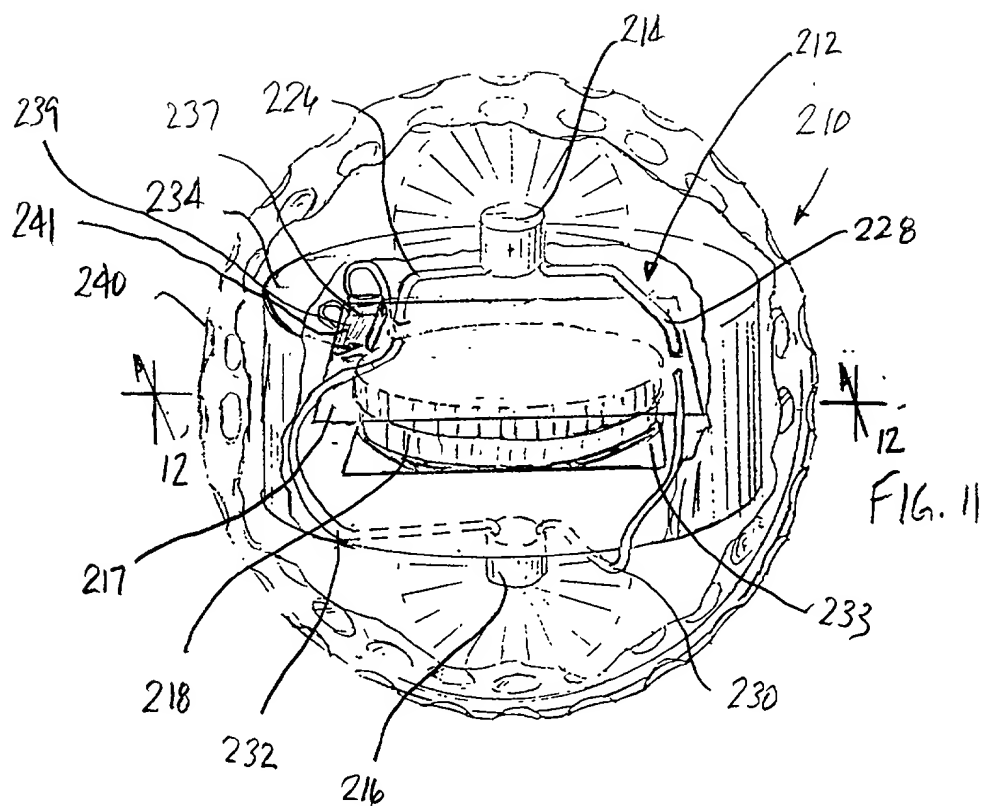

$$= 6.9$$


FIG. 1D



DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare:

That my residence, post office address and citizenship are as stated below next to my name.

That I verily believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

ILLUMINATED GOLF BALL

the specification of which (check one)

(x) is attached hereto.

() was filed on _____ as

Application Serial No.

and was amended _____
(if applicable)

That I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

That I acknowledge the duty to disclose information known to be material to patentability of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

That I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate on this invention having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

<hr/>	<hr/>	<hr/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(Number)	(Country)	(Day/Month/Year Filed)		
<hr/>	<hr/>	<hr/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
(Number)	(Country)	(Day/Month/Year Filed)		

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

<hr/>	<hr/>
(Application Number)	(Filing Date)
<hr/>	<hr/>
(Application Number)	(Filing Date)

That I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

United States Application(s)

<hr/>	<hr/>	<hr/>
(Application Serial No.)	(Filing Date)	(Status)-(Patented, pending, abandoned)
<hr/>	<hr/>	<hr/>
(Application Serial No.)	(Filing Date)	(Status)-(Patented, pending, abandoned)

That all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

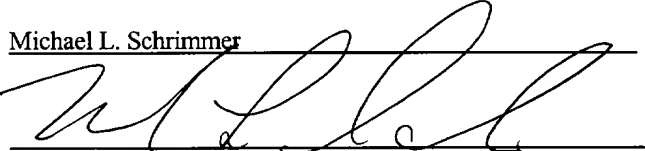
I hereby appoint the following attorneys, with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith and request that all correspondence and telephone calls in respect to this application be directed to WELSH & KATZ, LTD., 120 South Riverside Plaza, 22nd Floor, Chicago, Illinois 60606, Telephone No. (312) 655-1500:

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Jerold B. Schnayer	28,903
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Joseph R. Marcus	25,060
Gerald S. Schur	22,053
Gerald T. Shekleton	27,466
James A. Scheer	29,434
Daniel R. Cherry	29,054
Edward P. Gamson	29,381
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Inventor's signature:



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[illegible]

Applicant or Patentee: Michael L. Schrimmer and Thomas Musial
Serial or Patent No.: _____
Filed or Issued: _____
For: ILLUMINATED GOLF BALL

Atty Docket No. 5104/71695

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS

(37 CFR 1.9(f) AND 1.27(c) - SMALL BUSINESS CONCERN)

I hereby declare that I am

- ☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN: Chemical Light, Inc.
ADDRESS OF CONCERN: 5 Messner Drive, Wheeling, IL 60090

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time, or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled:

ILLUMINATED GOLF BALL

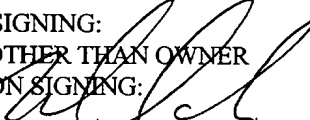
by inventor(s): Michael L. Schrimmer and Thomas Musial
described in:
☒ the specification filed herewith.
☐ application serial no. _____, filed _____
☐ Patent No. _____, issued _____

If the rights held by the above-identified small business concern are not exclusive, each individual, concern, or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e). *NOTE: Separate verified statements are required from each named person, concern, or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

NAME Michael L. Schrimmer
ADDRESS 5 Messner Drive, Wheeling, IL 60090
☐ INDIVIDUAL ☒ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: Michael L. Schrimmer
TITLE OF PERSON OTHER THAN OWNER President
ADDRESS OF PERSON SIGNING: 5 Messner Drive, Wheeling, IL 60090
SIGNATURE:  Date: 5-27-98